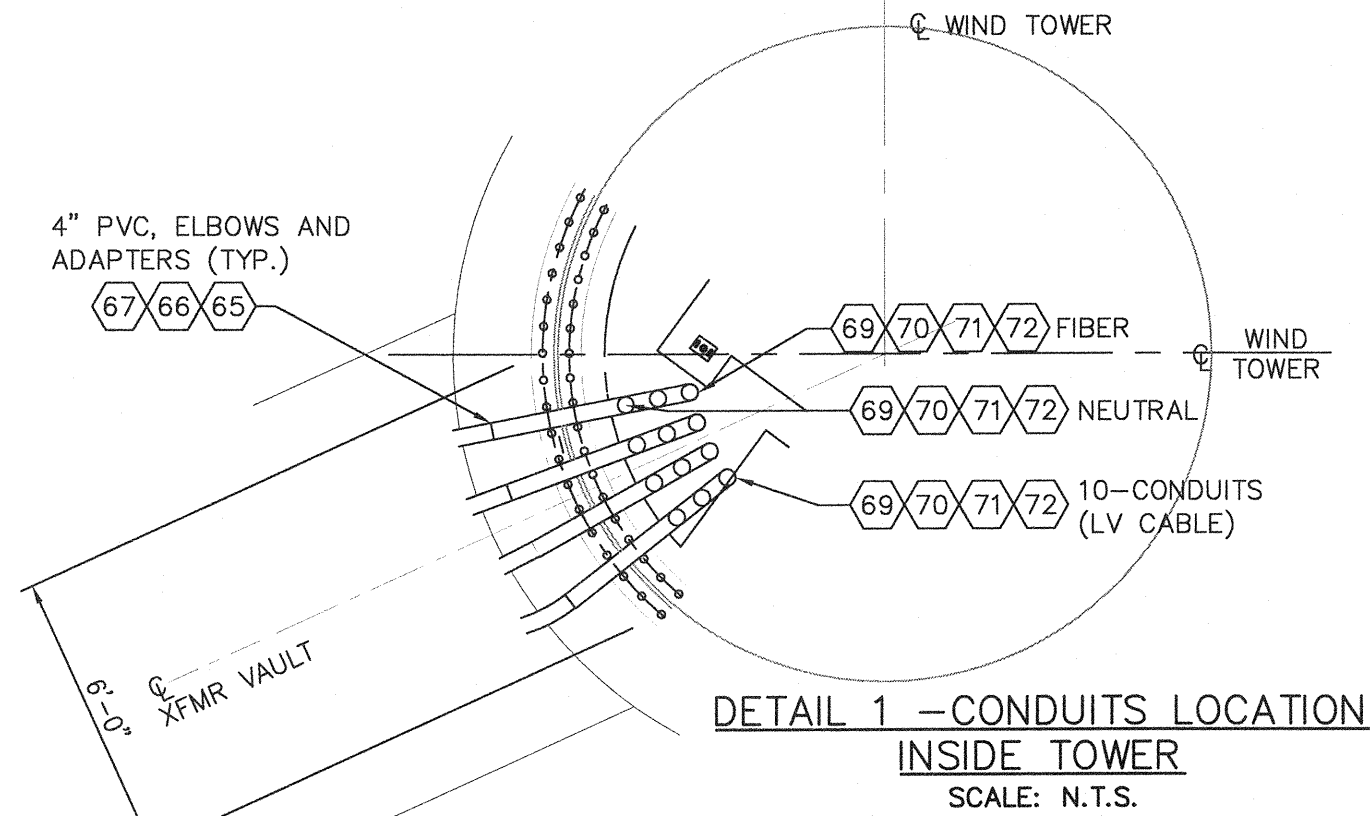
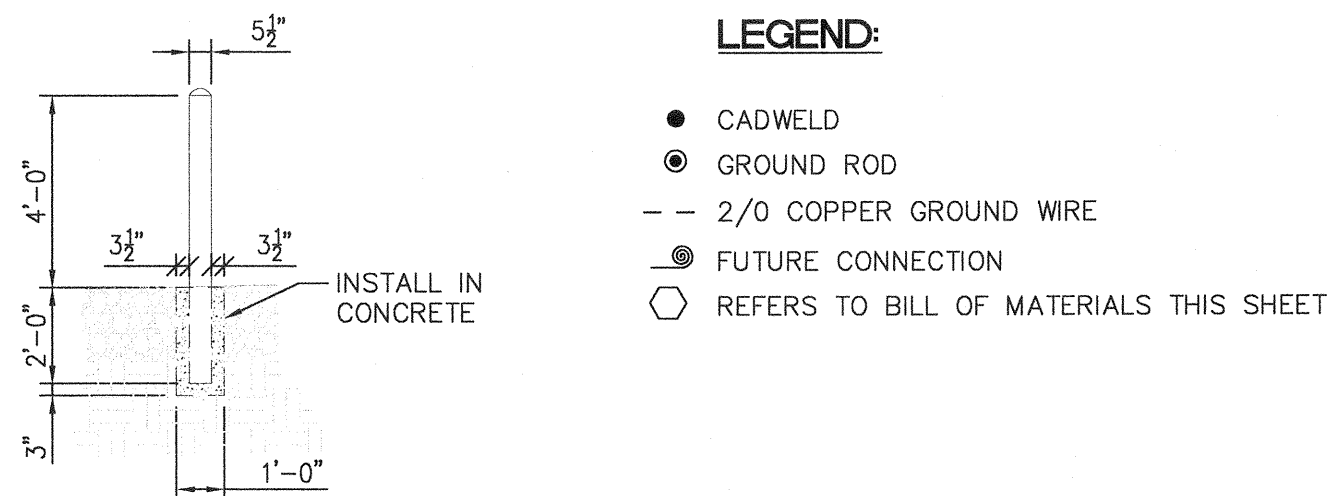


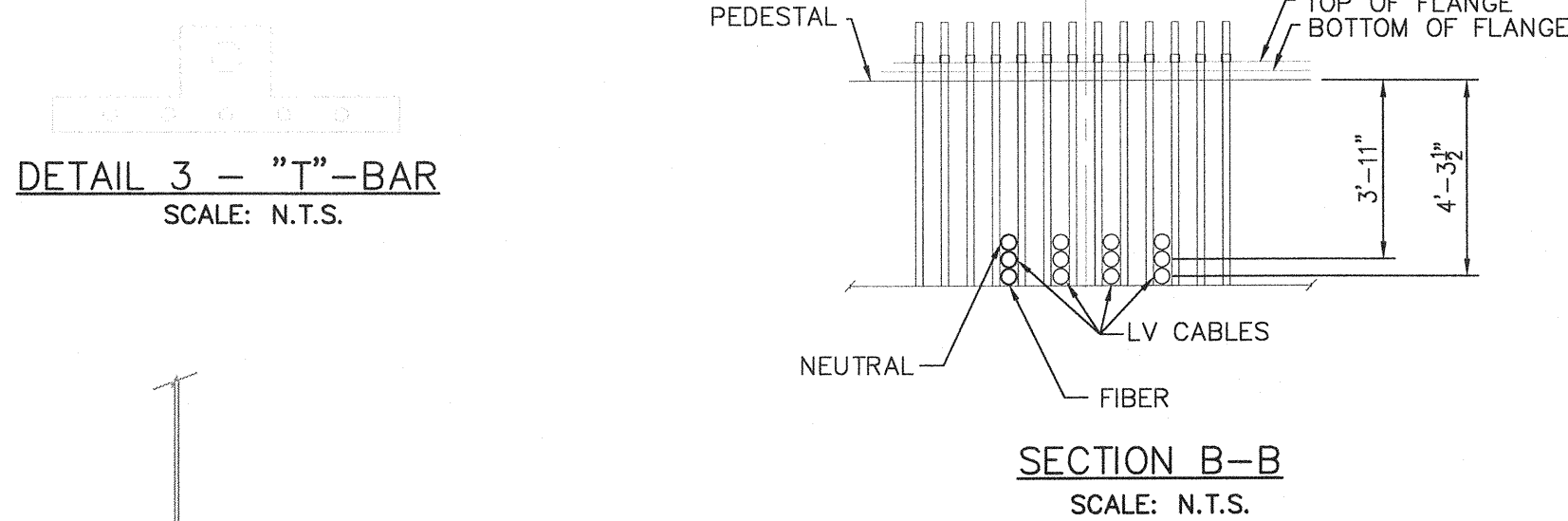
PLAN: TOWER FOUNDATION AND GROUNDING
SCALE: N.T.S.



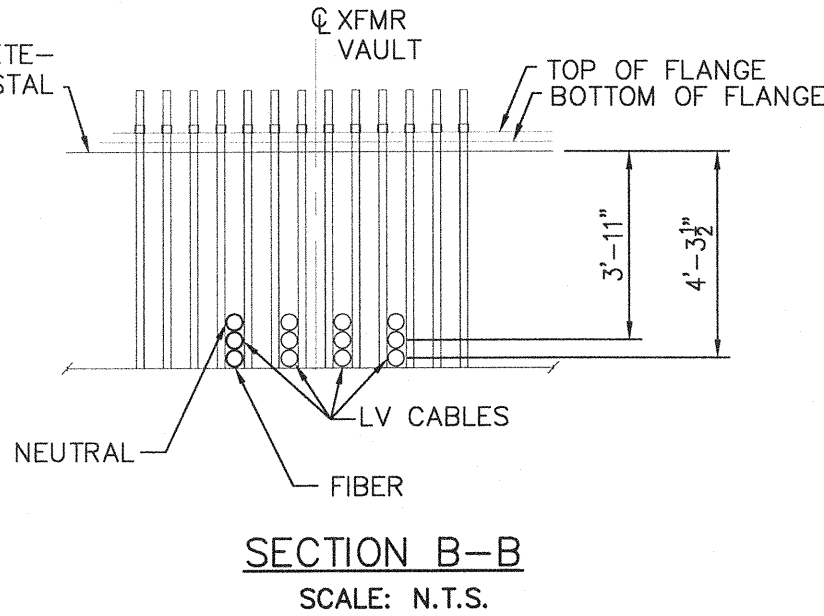
DETAIL 1 - CONDUITS LOCATION
INSIDE TOWER
SCALE: N.T.S.



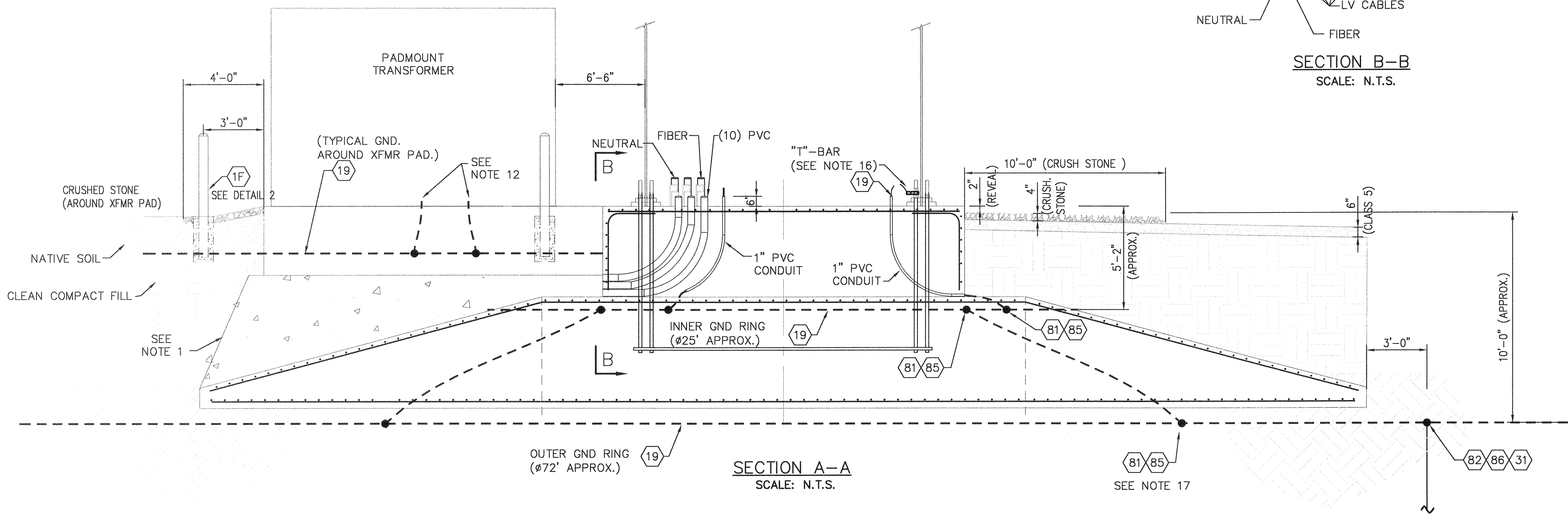
DETAIL 2 - BOLLARD
SCALE: N.T.S.



DETAIL 3 - "T"-BAR
SCALE: N.T.S.



SECTION B-B
SCALE: N.T.S.



SECTION A-A
SCALE: N.T.S.

BILL OF MATERIALS - CONDUIT & GROUNDING							
ITEM	QUANTITY	UNIT	DESCRIPTION	MANUFACTURER	CATALOG		
1F	4	EA	BOLLARD 5 1/2" O.D. X 6'-0", CONCRETE FILLED, PAINTED YELLOW OR PROVIDE YELLOW COVERS				
19	545	FT	WIRE, 2/O COPPER BARE, STR				
31	4	EA	GROUND ROD, 5/8" X 8'	BLACKBURN - OE	6258		
50	0	EA	LUG, COMPRESSION, COPPER, 2 HOLE, 4/O AWG	BURNDY	YGH28-2N		
65	6	EA	4" PVC CONDUIT, 10' SCHEDULE 40 RIGID NONMETALLIC CONDUIT (RNC)	CARLON	49015-010		
66	12	EA	4" PVC END BELLS	CARLON	E997N		
67	6	EA	4" PVC CONDUIT, 45' ELBOW, 36" RADIUS	CARLON	UB9FN		
69	12	EA	4" PVC CONDUIT 90' ELBOW, 36" RADIUS, ID-TYPE	CARLON			
70	40	FT	4" PVC CONDUIT, ID-TYPE	CARLON			
71	12	EA	4" PVC END BELLS	CARLON			
72	12	EA	4" PVC COUPLING	CARLON			
74	2	EA	1" PVC CONDUIT, 10' SCHEDULE 40 RIGID NONMETALLIC CONDUIT (RNC)	CARLON	49008-020		
75	6	EA	1" PVC END BELLS	CARLON	E997F		
76	3	EA	1" PVC CONDUIT, 90' ELBOW, 36" RADIUS	CARLON	UB9FF		
77	6	EA	1" PVC COUPLING	CARLON			
81	17	EA	2/O COPPER RUN TO 2/O COPPER TAP, TYPE TA CONNECTION, DARK BLUE CONTAINER	CADWELD	TA		
82	4	EA	2/O COPPER RUN TO GROUND ROD, TYPE GY CONNECTION, GRAY CONTAINER	CADWELD	GY		
83	2	EA	2/O COPPER TO 2/O COPPER, TYPE SS CONNECTION, ORANGE CONTAINER	CADWELD	SS		
85	**	EA	MOLD WITH BAFFLE FOR 2/O COPPER RUN TO 2/O COPPER TAP, TYPE TA CONNECTION	CADWELD	TAC-2G2G		
86	**	EA	MOLD WITH BAFFLE FOR 2/O COPPER TO GROUND ROD, TYPE GY	CADWELD	GYE-182G		
87	**	EA	MOLD WITH BAFFLE FOR 2/O COPPER TO 2/O COPPER, TYPE SS CONNECTION	CADWELD	SSC-2G		
94	8	EA	POWER UNIT ANCHOR BOLT - SEE SIEMENS SPECIFICATION				
95	**	EA	HANDLE CLAMP (AS NEEDED)	CADWELD PLUS	L160		
96	9	CU	CRUSHED STONE #57				

GENERAL NOTES:

- LEAN CONCRETE SHALL BE INSTALLED UNDER VOLTAGE TRANSFORMER AND SURROUND THE LOW VOLTAGE CONDUITS EXITING THE TURBINE PEDESTAL AS SHOW IN SECTION A-A. LEAN CONCRETE MIX SHALL HAVE A MAXIMUM THERMAL RESISTIVITY OF 60 RHO.
- FOR LOW VOLTAGE CABLES, INSTALL ONE A, B, AND C PHASE IN EACH CONDUIT TO ENSURE REQUIRED AMPACITY IS REACHED.
- TRANSFORMER PAD SHOULD BE SUPPLIED BY CONTRACTOR AND INSTALLED PER MANUFACTURER SPECIFICATIONS.
- SEE SIEMENS DOCUMENTATION FOR PROVIDED MATERIAL, FOUNDATION GROUNDING, EARTHING, CONDUIT PROCEDURES, AND LOCATIONS.
- NOT USED
- PADMOUNT TRANSFORMER SHOULD BE AWAY FROM THE DOOR AS SHOWN ON PLAN VIEW.
- BOLLARDS SHALL BE LOCATED 3'-0" FROM THE CORNER OF THE TRANSFORMER.
- ALIGN WIND TURBINE GENERATOR TOWER DOOR FACING THE CRANE PAD.
- ANCHOR BOLT LOCATIONS HAVE A TOLERANCE OF +/- 3/16" - PLEASE REFER TO SIEMENS DRAWINGS 1006928 , 1006932 AND 1006931 FOR INSTALLATION AND MOUNTING DETAILS FOR POWER UNIT ANCHOR BOLTS.

GROUNDING NOTES:

- AFTER INSTALLATION, CONTRACTOR SHALL TEST EACH WIND TURBINE GROUNDING SYSTEM USING THE FALL-OFF-POTENTIAL METHOD BEFORE CONNECTING CABLE NEUTRALS AND EARTH INTERCONNECTION WIRES. RESISTANCE TO EARTH OF 10 OHMS OR LESS SHALL BE CONFIRMED AND RECORDED PER SIEMENS REQUIREMENTS. ADD ADDITIONAL 2/O KCMIL GROUND WIRE AND GROUND RODS AS NECESSARY. ENGINEER SHALL BE CONSULTED PRIOR TO INSTALLATION OF CHEMICAL GROUND WELLS.
- CONTRACTOR SHALL LOCATE GROUNDING EXIT POINTS ON TOWER PEDESTAL.
- TWO LEADS FROM TRANSFORMER GROUND FOR BONDING CONCENTRIC NEUTRALS OF 34.5KV CABLES. SEE DRAWING E-PM-01 FOR DETAILS.
- "T"-BAR FOR EARTHING (SUPPLIED BY VENDOR)- SEE SIEMENS DRAWING 1008731 FOR DETAIL.
- GROUNDING CONDUCTOR SHALL BE TURNED UP ABOVE GRADE FOR FUTURE CONNECTION TO CHEMICAL GROUND WELLS IF REQUIRED. ENGINEER SHALL BE CONSULTED PRIOR TO INSTALLATION OF CHEMICAL GROUND WELLS.
- NOT USED
- GROUND WIRE FROM "T"-BAR (BOLTED), THROUGH 1" CONDUIT, TO THE INNER GROUND RING. 3 PLACES 120° APART. "T"-BAR LOCATED ABOVE STRUCTURAL NUT BELOW ADDITIONAL LOCK NUT OF SAME TYPE.
- GROUND WIRE FROM INNER RING TO OUTER RING. (CADWELD), 4 PLACES, 90° APART.
- GROUNDING FOR GSU TO BE LOCATED OUTSIDE THE PERIMETER OF CONCRETE OF GSU.
- 9 GSU NEUTRAL CONDUCTORS SHALL BE RUN IN SEPARATE CONDUIT.
- CONDUCTOR NEUTRALS FROM THE GSU NEUTRAL BUSHING SHALL BE EQUALLY CONNECTED TO THE "T"-BARS IN THE TOWER. CONDUCTORS SHALL BE ROUTED ALONG THE TOWER WALL, OUTSIDE OF THE ANCHOR BOLTS.

CONDUITS NOTES:

- FIELD CONTRACTOR SHALL POSITION CONDUIT FOUNDATION PENETRATION TURN-UPS.
- NOT ALL CONDUITS ARE SHOW FOR CLARITY.



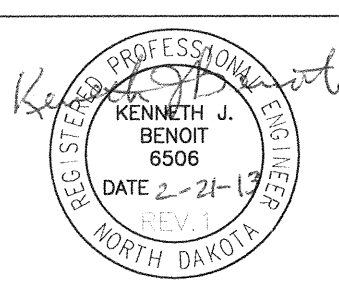
REFERENCE DRAWINGS:

BARR PROJECT NO. 34/33-1006 DRAWING S-01 - SPREAD FOOTING FOUNDATION PLAN, ELEVATION, SECTION & DETAILS
SIEMENS WIND TURBINES-EARTH TERMINATION SYSTEM, DOCUMENT PG-R3-30-0000-0182-05
SIEMENS DRAWINGS - 1008731, 1006928 , 1006932 & 1006931

BISON 3 WIND PROJECT
MORTON & OLIVER COUNTIES, NORTH DAKOTA
COLLECTOR SYSTEM
CONDUIT & GROUNDING DETAIL

BARR PROJECT No.
34/33-1006
CLIENT PROJECT No.
DWG. No.
E-TD-31
REV. No.
1

NO.	BY	CHK	APP.	DATE	REVISION DESCRIPTION
A	MME	CEG	CSF	7/8/11	60% DELIVERABLE
B	BNK	RJG	CSF	8/16/11	85% DELIVERABLE
C	BNK	CSF	CSF	9/20/11	90% DELIVERABLE
O	BNK	CSF	JLM	10/4/11	ISSUED FOR CONSTRUCTION
1	NJG	KPH	JLM	12/11/12	CONSTRUCTION REVISIONS



CLIENT	7/8/11/8/16/11/9/20/11/10/4/11
BID	
CONSTRUCTION PERMITTING	
RELEASED TO/FOR	C D E O 1 2 3
DATE RELEASED	



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Scale	N.T.S.
Date	07/08/11
Drawn	MME
Checked	CSF
Designed	MME
Approved	JLM

